Brief communication

Back pain and behavioral habits of high school students: a comparative study of two Brazil's regions

Dor nas costas e hábitos comportamentais de estudantes do ensino médio: estudo comparativo de duas regiões do Brasil

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Introduction

Several studies have demonstrated that back pain is a common and very expensive problem of contemporary societies.[1,2] Recent research performed by Ministry of Health with the Brazilian Institute of Geography and Statistics[3] demonstrated that 27 million adults in Brazil are affected by spine disease. These results are still more worrying because we already know there are a high prevalence of Brazilian children and adolescent affected with back pain[4,5] and postural alterations.[6,7]

Recent reviews[8] demonstrate that the back pain and postural alterations are related with several factors, as physical, behavioral, genetic and psychosocial. A recent study[9] demonstrated that the back pain in Polish youth also depend on place of residence. A cross-sectional population-based study evaluated 502 village residents and 1593 city residents. They concluded that the conditions of living in a rural and in an urban environment in Poland pose no specific threat determining the occurrence of back pain in youths. However, whereas we know, no other study has evaluated differences between different places or regions in a same country.

Furthermore, back pain research conducted in Brazilian children and adolescents is an emerging area because Brazil is a continental country with different characteristics between the regions (Brazil is geopolitically divided into five regions and each region is composed of three or more states), and the

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formulation and development of public health and education should not be based on general features. Therefore, to promote more specific information about this topic it is appropriate to carry out this study that aim to compare the prevalence of back pain and behavioral habits of students about two Brazil's cities, from Ceres, Goiás state, and Teutônia, Rio Grande do Sul state. Ceres, situated in the center of Brazil, there is 21,782 people, territorial area of 214,322 km^2 and population density of 96.69 (hab/km^2); and Teutônia, situated in southern Brazil, there is 29,802 people, area of 178,460 km^2 and population density 152.68 (hab/km^2).[10]

Method

Participants

This is an epidemiological population cross-sectional and exploratory study conducted in the second half of 2014. The study included 1546 students from four secondary education institutions in the municipality of Ceres (one federal, one state and two private schools); and from 5 secondary education institutions of Teutônia (two municipalities, two states and one of private school). The municipalities were chosen intentionality.

Table 1 describes the participants stratified by sex and age to the cities of Ceres and Teutônia. This study was approved by the Research Ethics Committee of the Federal Institute Goiano and Federal University of Rio Grande do Sul, under number 012/2013 and 19832/2010, respectively, and respected the Resolution 466/12 of the National Health Council. The students were allows to leave the study at will and to opt out of our procedure. Prior to participation, the students, and their parents or guardians voluntarily signed an informed consent form approved specifically for this study.

Instrument

A self-administered questionnaire titled 'Back Pain and Body Posture Evaluation Instrument' (BackPEI) was utilized, which is a valid and reproducible questionnaire ($n = 260$, ICC = 0.937, Agreement > 70%) for Brazilians students, consisting of closed questions and a different version for each sex.[11] The questionnaire addressed the back pain in the last three months, behavioral issues and pain intensity (VAS). For more information see the original validation and reproducibility paper.[11]

Data collection and analysis

After explained the research aims and obtaining agreement from the DE, a meeting was scheduled with the director of each school to present the research project. When agreement was obtained from all directors, a date to conduct the evaluations was scheduled for each school. The researcher responsible for administering the questionnaire handed a BackPEI copy to each student in the classroom. Initially, the researcher collectively explained how the questionnaire should be answered; after it was distributed, the researchers answered each student individually.[11] The researcher remained in the room during the completion of the questionnaires, which took 20 min duration on average, collecting them when all had finished school. The same methodology was used for the Ceres and Teutônia by the same researcher.

Statistical analysis was performed using the Statistical Package for Social Sciences (version 20.0). Postural and behavioral habits were analyzed separately for each municipality using descriptive statistics. We used the chi-square test to check if have difference in the occurrence and frequency of back pain and behavior habits between municipalities Ceres and Teutônia. We also used the t independent test to check if have differences in the intensity of back pain both municipalities for female and male ($\alpha = 0.05$).

Results

The results showed high prevalence of inadequate postural for all habits except means of transport of school supplies and mode used for this transport (Table 2). The results were positive with respect to time in front of television and computer, because most school remains 0–3 h a day in these positions for both cities. However, the fact that only 32.3% of the students sleep the time recommended in the literature (8–9 h per day) is worrying (Table 2). It was verified difference between cities on time watching television and computer per day, hours of sleep per night, preferred sleeping position, pick up object on the ground and means of transportation of school supplies (X).

The results also showed high prevalence of back pain in the last 3 months (64%), high frequency (55.8%, once or more per week) being higher for students from Ceres (62.4%, once or more per week) compared to school of Teutônia (49%, once or more per week) (Table 3). No differences ($p > 0.05$) were found in back pain intensity between both municipalities.

Age (years)	Ceres			Teutônia		
	Male n (%)	Female n (%)	Total n (%)	Male n (%)	Female n (%)	Total n (%)
14	10 (2.5)	6 (1.4)	16 (1.9)	53 (15.2)	66 (17.8)	119 (16.6)
15	105 (25.7)	146 (34.8)	251 (30.4)	109 (31.3)	118 (31.8)	227 (31.6)
16	108 (26.5)	127 (30.3)	235 (28.4)	95 (27.3)	99 (26.7)	194 (27)
17	141 (34.6)	101 (24.1)	242 (29.3)	60 (17.2)	65 (17.2)	125 (17.4)
18	35 (8.5)	32 (7.6)	67 (8.1)	23 (6.6)	22 (5.9)	45 (6.3)
19	9 (2.2)	7 (1.7)	16 (1.9)	08 (2.3)	1 (0.3)	09 (1.3)
Total	408 (49.3)	419 (50.7)	827 (100)	348 (48.4)	371 (51.6)	719 (100)

Table 1 – Distribution of students by gender and age from Ceres/GO and Teutônia/RS.

Table 2 – Prevalence and association (χ^2) between municipalities for behavioral and postural variables.

Variables (n)	Total n (%)	Ceres n (%)	Teutônia n (%)	χ^{2a}
How many hours per day do you usually spend sitting watching television? (n = 1345)				
0–3 h	1109 (82.5)	591 (85)	518 (79.7)	0.023[c]
4–5 h	172 (12.8)	79 (11.4)	93 (14.3)	
≥6 h	64 (4.7)	25 (3.6)	39 (6.0)	
How many hours per day do you spend seated using your desktop/laptop computer? (n = 1251)				
0–3 h	976 (78.0)	520 (81.3)	456 (74.7)	0.005[c]
4–5 h	162 (13)	64 (10.0)	98 (16.0)	
≥6 h	113 (9.0)	56 (8.7)	57 (9.3)	
Do you usually read or study in bed? (n = 1534)				
Yes	1149 (74.9)	606 (74.0)	543 (75.9)	0.379
No	385 (25.1)	213 (26.0)	172 (24.1)	
How many hours do you spend sleeping in a day – 24 hour period? (n = 1351)				
0–7 h	868 (64.3)	494 (68.7)	374 (59.2)	0.001[c]
8–9 h	436 (32.3)	203 (28.2)	233 (36.8)	
≥10 h	47 (3.5)	22 (3.1)	25 (4.0)	
What is your favorite sleeping position? (n = 1368)				
Lateral decubitus	620 (45.3)	279 (39.2)	341 (52.0)	0.001[c]
Prone (Inadequate)	603 (44.1)	357 (50.1)	246 (37.5)	
Supine	145 (10.6)	76 (10.7)	69 (10.5)	
How do you typically sit at your desk when writing while in school? (n = 1505)				
Inadequate	1410 (93.7)	748 (94.0)	662 (93.4)	0.633
Adequate	95 (6.3)	48 (6.0)	47 (6.6)	
How do you typically sit on a chair or a bench when talking to your friends? (n = 1523)				
Inadequate	1456 (95.6)	773 (95.8)	683 (95.4)	0.707
Adequate	67 (4.4)	34 (4.2)	33 (4.6)	
How do you typically sit when using your desktop or laptop computer? (n = 1523)				
Inadequate	1353 (88.8)	729 (90.2)	624 (87.3)	0.068
Adequate	170 (11.2)	79 (9.8)	91 (12.7)	
How do you typically pick up objects from the floor? (n = 1534)				
Inadequate	1341 (87.4)	735 (90.0)	606 (84.5)	0.001[c]
Adequate	193 (12.6)	82 (10.0)	111 (15.5)	
What do you use to carry your material to the school? (n = 1531)				
Backpack with 2 straps	1337 (87.3)	635 (77.9)	702 (98.0)	0.001[c]
Others (Backpack with 1 strap, Briefcase, Bag)	194 (12.7)	180 (22.1)	14 (2.0)	
How do you typically carry your backpack to the school? (n = 1314)[b]				
Adequate	919 (69.9)	438 (70.9)	481 (69.1)	0.486
Inadequate	395 (30.1)	180 (29.1)	215 (30.9)	

[a] Chi-square test.
[b] Related only to those schoolchildren to which variable applies
[c] Significant association (p < 0.05).

Discussion

The present study aims to compare the prevalence of back pain and behavioral habits of students about two Brazil's cities, Ceres, Goiás, and Teutônia, Rio Grande do Sul. The main result was the prevalence difference between cities on frequency of back pain, time watching television and computer per day, hours of sleep per night, preferred sleeping position, pick up object on the ground and means of transportation of school supplies. This suggests that the regions areas present specific conditions and could be related with occurrence of back pain in youths.

An similar study, performed in Poland by Lewandowski and Lukaszewska,[9] compared the back pain prevalence between youths inhabiting villages and cities. Different from our study, they concluded that prevalence and characteristics of back pain (localization, frequency, and circumstances of occurrence) and the functional consequences of back pain in youths are not dependent on the place of residence. The authors related to the advances in technology used in agriculture and the respectively lesser physical load of 'country children'. At the same time, many rural areas have become suburban satellites with modern building and infrastructure, where residents commute to cities for work. These phenomena diminish differences between the residents of villages and cities. However,

Table 3 – Back pain occurrence, frequency in last three months, impediment of performing daily activities and back pain intensity.				
Variables (n)	Total n (%)	Ceres n (%)	Teutônia n (%)	χ^{2a}
Have you felt (or have been) back pain in the last 3 months? (n = 1461)				
Yes	935 (64)	499 (64.1)	436 (63.8)	0.904
No	526 (36)	279 (35.9)	247 (36.2)	
How often do you feel (or felt) back pain? (n = 775)[b]				
Only once	209 (27.0)	75 (18.8)	134 (35.6)	0.001[c]
Once a month	133 (17.2)	75 (18.8)	58 (15.4)	
Once a week	169 (21.8)	84 (21.1)	85 (22.6)	
2 to 3 times a week	178 (23.0)	105 (26.3)	73 (19.4)	
4 or more times a week	86 (11)	60 (15)	26 (7)	
Does the pain prevent (or have prevented) you from performing daily life activities? (n = 929)[b]				
Yes	134 (14.4)	68 (13.7)	66 (15.2)	0.344
No	743 (80.0)	395 (79.8)	348 (80.2)	
I do not know	51 (5.5)	32 (6.5)	19 (4.7)	
	Total Mean (SD)	Ceres Mean (SD)	Teutônia Mean (SD)	p^d
On the scale from 0 to 10, please identify the intensity of you back pain for the last 3 months (n = 930)[b]				
All students	3.43 (2.18)	3.53 (2.24)	3.32 (2.10)	0.149
Male	3.13 (2.07)	3.28 (2.12)	2.96 (2.01)	0.128
Female	3.65 (2.23)	3.69 (2.30)	3.59 (2.13)	0.591

[a] Chi-square test.
[b] Related only to those students which have back pain.
[c] Significant association (p < 0.05).
[d] T independent test.

in Brazil, a continental country geopolitically divided into five regions (approximately 27 times higher in area than Poland), we could speculated that several factors may be influence, as human development index, cultural habits, colonization, climate, but we cannot tell exactly which. More studies are necessary to elucidate this case.

Our results are worrying for both cities because it was verified a high prevalence of back pain in the last 3 months, which is in the head back pain rates described in the literature that vary from 20% to 70%,[12–16] and high prevalence of inadequate behavioral and postural habits. When posture is affected by an awkward body position while sitting or when lifting a heavy school bag, the musculoskeletal system is compromised. Workstations in schools may contribute to prevent and perhaps reduce musculoskeletal pain in school-aged children. During classroom lessons, children often sit with poor posture, having their trunk, back, and neck flexed or rotated for long period.[17]

In relation to the high prevalence of adequate posture when carrying school material, which is opposed to the prevalence rates for other postural habits, as most school uses rightly the schoolbag for transportation of the material (77.9% for Ceres and 98% for Teutônia) and the same is carried symmetrically on the shoulders (70.9% and 69.1%, respectively), for the transport thereby significantly reduces the tilt torques harmful to the spine. It is speculated that this result may be the effect of preventive programs carried out in recent years, specifically for teaching this habit,[18,19] as well as the strong emphasis given by the media specifically for this position.[20]

Investigations as this study are relevant as their results enable direct educational and preventive work. For example, in Brazil, the country with big differences and big area, is relevant to develop specific health and education policies.[21] The permanent health education is a fundamental strategy in daily practice, since it brings performance reflective, purposeful, committed and competent. There is need, however, to decentralize the teaching ability and make specific programs for each region and for the realities of each target audience.[22]

In this light, know the most harmful habits and act on the correction of the same is a great alternative to minimize or to prevent poor habits in the school environment[23,24] and therefore prevent standards undertaken in this stage of life become permanent in adulthood.[21] Education programs should be structured to include not only immediate strategies but al long-term targets with continuous revaluations. Moreover, our results may help, for example, rheumatologists[25] in diagnostic and treatment; and physiotherapists[26] in interventions such as back schools and exercise programs.

In general, students from both cities present high prevalence and frequency of back pain in the last 3 months. Our study also show differences between cities on frequency of back pain, time watching television and computer per day, hours of sleep per night, preferred sleeping position, pick up object on the ground and means of transportation of school supplies. However, although the results indicate some differences between both cities, the high prevalence of back pain and worrying postural data indicate similar public health problems. In short, this type of information can support the

preparation of generic and specific prevention programs in the school for each situation and city.

Conflicts of interest

The authors declare no conflicts of interest.

Acknowledgements

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